NASA/JPL Workshop on Biomorphic Robotics

August 14-16, 2000
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California, USA

Sponsors

Revolutionary Computing Technologies, Center for Integrated Space Microsystems, Jet Propulsion Laboratory

Advanced Concepts, Space Mission Technology Program, Jet Propulsion Laboratory

Iguana Robotics

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Modern robots still remain far behind animals at maneuvering, exploring and manipulating objects in unstructured complex environments. Therefore we may gain advantages by emulating the biomechanics, sensory systems, nervous structures and control algorithms found in animals. The emerging field of Biomorphic Robotics encompasses designs inspired by these principles.

The NASA Workshop on Biomorphic Robotics will be held in Pasadena, California, and hosted by the Jet Propulsion Laboratory, California Institute of Technology. The purposes of this workshop are to:

- Help define and influence the course of research for the design of autonomous, biomorphic robots for future NASA missions.
- Inform biomorphic robotics researchers about NASA and JPL needs and possibilities for future missions.
- Overview the state of the art in biomorphic robotics.
- Establish collaborations between NASA and biomorphic robotics researchers.

This field is expected to have major impact on future space missions that require more autonomous robotics and spacecraft. Potential applications include planetary rovers, telerobotic EVA assistants, and sensory-guided control for autonomous spacecraft maneuvers and remote sensing applications.

Workshop attendees will have the opportunity to discuss the fundamental issues and state-of-the art of biomorphic technologies, plans for development of future systems suitable for biomimetics, and needs related to space applications. The outcome of this meeting is expected to help guide a technology development roadmap that would lead to implementations for future NASA missions. The specific focus of the Brainstorming Session will be to define and integrate the system components necessary in the overall design of a biomimetic robot suitable for a Legged Rover for Mars Exploration.

Topics include, but are not limited to

- Locomotion in biomorphic robots: walking, hopping, flying, swimming
- Neuromorphic sensory systems for autonomous rovers
- Biomorphic actuation (including McKibben air muscles and Electro-Active Polymers)
- Bio-inspired sensory-motor control algorithms (including models of cerebellum)
- Learning for Navigation
- Humanoid robotics

Submission of papers

Prospective authors are invited to email a detailed abstract (limit 2 pages) to bioworkshop@cism.jpl.nasa.gov, in PDF, Word or plain text format. Use for the subjectline: Biomorphic Robotics Workshop abstract. Abstracts may also be electronically submitted through the workshop web page. Each abstract should contain the following items: (1) title of paper, (2) author name(s), (3) corresponding author physical address and phone number. Full papers of accepted participants are due at the meeting to be distributed for reviews and feedback. Selected manuscripts will be published in the workshop proceedings after the meeting.

Important Dates: Abstract Submission deadline: June 26, 2000
Author notification by: July 7, 2000

Web Site: ***http://cism.jpl.nasa.gov/biocomputing/workshop***

Registration and Check-In Information

The meeting will be held in the auditorium of the Beckman Institute on the Caltech campus. The first session is scheduled to begin at 1:30 pm on Monday, August 14. Parking is available in campus parking structures. On-site check-in will begin at 12:30 pm at the meeting site. The workshop registration fee of $100.00 includes break service, reception, and a group dinner. Accomodation and transportation information can be found at our workshop web site.